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would be as accessible as any of our commercial cities. The Paraná, from its mouth to Rosario, is not very tortuous, having a general course of N.N.W. The prevailing south wind is, therefore, fair in the ascent throughout this distance. I must not omit to state that such a wind is necessary to all sailing-vessels, because the current of two to two and a-half miles per hour will baffle all efforts to contend with it by beating. . . . In descending the river no detention need ever occur, its width being sufficient to admit of beating down during contrary winds."

Whether Mr. Wheelwright purposes to continue the line across to Caldera by the designed route through Rioja and the western part of Catamarca, and over the Andes Pass of San Francisco, or whether he will endeavour to ascertain the existence of a shorter and easier route, reported as lately discovered between San Juan and Mendoza, therefore in a more direct line to Valparaiso, I cannot say. But in whatever direction this work may be effected, by joining, as it were, the Atlantic and Pacific Oceans across the South American Continent, it must eventually prove the most beneficial, most important, and most advantageous, in a commercial as well as civilizing point of view, of any engineering work of modern times.

XVI. — *Explorations to the West of Lake Nyassa in 1863.*

By Dr. DAVID LIVINGSTONE, M.D., LL.D., F.R.G.S. (Gold Medallist.)

(Addressed to Sir R. I. MURCHISON, Pres. R.G.S.)

Read, June 13, 1864.

"Murchison's Cataracts, Dec. 4, 1863.

"THE despatch containing instructions for our withdrawal, though dated 2nd of February, did not reach me before the 2nd of July, when the water had fallen so low that the *Pioneer* could not be taken down to the sea. To improve the time, therefore, between July and the flood of December, I thought that I might see whether a large river entered the northern end of Lake Nyassa, and, at the same time, ascertain whether the impression was true that most of the slaves drawn to Zanzibar, Kilua, Iboe, and Mozambique, came from the Lake district. With this view, I departed, taking the steward of the *Pioneer* and a few natives, carrying a small boat, and ascended the Shiré. Our plan was to sail round the eastern shore and the north end of the lake, but unfortunately

we lost our boat when we had nearly passed the falls of the Shiré; the accident occurring through five of our natives trying to show how much cleverer they were than the five Makololo who had hitherto had the management of it. It broke away from them in a comparatively still reach of the river, and rushed away like an arrow over the cataracts. Our plans after this had to be modified, and I resolved to make away for the north-west on foot, hoping to reach the latitude of the northern end of the lake without coming in contact with the Mazite, or Zulus, who have depopulated its north-western shores, and then go round the Lake from the west.

"We soon came to a range of mountains running north and south, rising about 6000 feet above the level of the sea. The valley on the eastern base was 2000 feet above the sea, and was of remarkable beauty—well supplied with streams of delicious cold water. This range forms the edge of the high table-land (called Déza) on which the Maravi dwell. We were, however, falsely told that no people lived on the other side, and continued our course along the valley until we came out at the heel of the lake—the bold mountainous promontory of Cape Maclear on our right, and the hills of Tsenga in front of us. Again starting off towards the north-west, we came to a stockade which the Mazite, or other natives pretending to be of this tribe, had attacked the day before, and we saw the loathsome relics of the fight in the shape of the dead bodies of the combatants. Wishing to avoid a collision with these people, we turned away towards the north-east until we again came to the Lake, and marched along its shores to Kota-Kota Bay (lat. $12^{\circ} 55' \text{ s.}$).

"At Kota-Kota Bay we found two Arab traders busily engaged in transporting slaves across the lake by means of their boats; they were also building a *dhow* to supply the place of one which was said to have been wrecked. These men said that they had now 1500 souls in their village, and we saw tens of thousands of people in the vicinity who had fled thither for protection. They were the same men whom we had seen on our last visit, but at that time they had very few people. Every disturbance amongst the native tribes benefits the slave-trader. They were paying one fathom of calico, value one shilling, for a boy, and two fathoms for a good-looking girl. Yet, profitable as it may seem, the purchase of slaves would not pay, were it not for the value of their services as carriers of the ivory conveyed to the coast by the merchants. A trader with twenty slaves has to expend at least the price of one per day for their sustenance: it is the joint ivory and slave trade which alone renders the speculation profitable. It was the knowledge that I was working towards undermining the slave-trade of Mozambique and Iboe by buying up the ivory, that caused the Portuguese to exert all their

obstructive power. I trust that operations in the interior, under a more able leader, will not be lost sight of; for these will do more to stop the slave-trade than all the cruisers on the ocean.

“Kota-Kota Bay, which is formed by a sandy spit running out and protecting the harbour from the east wind, is the crossing-place for nearly all the slaves that go to Kilua, Iboe, and Mozambique. A few are taken down to the end of the lake, and for cheapness cross the Shiré; but at Kota-Kota lies the great trade-route to Katanga, Cazembe, &c. The Babisa are the principal traders; the Manganja are the cultivators of the soil. The sight of the new *dhow* gave me a hint which perhaps may be useful. She was 50 feet by 12, and 5 feet deep. I should never think again of carrying more than the engine and boilers of a vessel past the cataracts; the hull could be built here more easily than it could be conveyed hither. On the southern shores of the Lake there are many trees whose trunks are above 2 feet in diameter and 60 feet in height without a branch. The Arabs were very civil when we arrived, and came forth to meet us, and presented us with rice, meal, and sugar-cane. Amongst other presents they made us was a piece of malachite.

“On leaving Kota-Kota we proceeded due west. In three days we ascended the plateau, the eastern side of which has the appearance of a range of mountains. The long ascent, adorned with hill and dale and running streams, fringed with evergreen trees, was very beautiful to the eye, but the steep walk was toilsome, causing us to halt frequently to recover our breath. The heights have a delicious but peculiarly piercing air: it seemed to go through us. Five Shupanga men, who had been accustomed all their lives to the malaria of the Zambesi Delta were quite prostrated by that which, to me, was exhilarating and bracing. We travelled about 90 miles due west on the great Babisa, Katanga, and Cazembe slave-route, and then turned to the north-west. The country is level, but the boiling-point showed a slope in the direction we were going. The edge of the plateau is 3440 feet above the sea-level. At the Loangwa of the Lake the height shown is 3270 feet. The direction of the streams verifies these approximate heights and your famous hypothesis too; for the Loangwa of the Lake finds its way backwards to the Nyassa, whilst another river of the same name, called the Loangwa of the Maravi, here flows to the westward, and enters the Zambesi at Zumbo. The feeders of these rivers are boggy valleys, with pools in their courses. We were told we had crossed one branch of the Moitala, or Moitawa, which flows N.N.W. into a small lake called Bemba. The valleys in which the rivers rise closely resemble those in Londa or Lunda; but here each bank is dotted over with villages, and a great deal of land is cultivated; the vegetation is more stunted, and the trees covered with flat

lichens, like those on old apple-trees in Scotland, besides a long thready kind similar to orchilla-weed; the land on which maize has been planted is raised into ridges instead of, as elsewhere, formed into hollows—all which reveals a humid climate.

As we were travelling in the direction whence a great deal of ivory is drawn by the traders on the slave-route, hindrances of various kinds were put in our way. The European food we had brought with us was expended; the people refused to sell us food, and dysentery came back on us in force. Moreover, our time was now expired. I was under explicit orders not to undertake any long journey, but to have the *Pioneer* down to the sea by the earliest flood. I might have speculated on a late rise in the Zambesi, but did not like the idea of failing in my duty, and so gave up the attempt to penetrate farther to the west. The temptation to go forward was very great; for Lake Bemba was said to be but ten days' journey distant; and from this, according to native report, issues the River Loapula (or Luapula) which, flowing westward, forms the lakes Mofu (or Mofue) and Moero, and then, passing the town of Cazembe, turns round to the north and is lost in Tanganyika. Is there an outlet to Tanganyika on the west into the Casai, to the east of the point at which I formerly crossed that river? All agreed in asserting that no river flowed eastward into Lake Nyassa. Two small ones do, but at a distance of, say, 80 or 90 miles from the lake; the watershed is to the west. One should have no bias in investigating these questions by the aid of travelled natives; but I had a strong leaning to a flow *from* Tanganyika into Nyassa or the Zambesi. I was, however, stoutly opposed by all; and I had crossed so many running streams, which, from entering the lake among reeds, had not been observed from the boat on our first visit, that, before reaching Kota-Kota, I had come to the conclusion that a large river from the north was not needed to account for the perennial flow of the Shiré. I am sorry I have only native information to give instead of my own direct observations; but, having been confined to work of much greater importance than exploration, the above was all I could achieve when set free.

“As the steward and myself were obliged to try our best during the limited time at our disposal, it may be worth mentioning that we travelled 660 geographical miles in 55 travelling days, averaging 12 miles per day in straight lines. The actual distance along the wavy, up and down paths we had was of course much greater. The new leaves on the trees of the plateau were coming out fresh and green, and of various other hues, when we were there, and on reaching the ship on the 31st of October, we found all, except the evergreen ones by streams, as bare of leaves as in mid-winter.

"P.S. *Shupanga*, Feb. 10, 1864.—The river rose in tremendous force on the 19th of January—much later than usual. Its lateness extracted many a groan from me, for it was plain that I had plenty of time to have examined Lake Bemba, which I suppose to be the beginning of the drainage system which finds an outlet by the Congo. Mofu, or Mofue, was seen, I believe, by Monteiro in his journey to Cazembe. Part of our line of march was along the route from Kilua to the same chief.

"DAVID LIVINGSTONE."

In a subsequent letter to Sir Roderick Murchison, written from Bombay, after crossing the Indian Ocean in his river-steamer *Lady Nyassa*, Dr. Livingstone gives further information relating to his recent expedition:—

"Poonah, 18th June, 1864.

"WE arrived at Bombay on the 13th instant, after a passage of 44 days from Zanzibar. From Zanzibar we crept along the African coast, in order to profit by a current of at least 100 miles a day. If Solomon's ships went as far south as Sofala, as some suppose, they could not have done it during the south-west monsoon against such a current. We went along beautifully till we got past the line; we then fell in with calms, which continued altogether for $24\frac{1}{2}$ days. The sea was as smooth as glass; and, as we had but one stoker, we could not steam more than 9 or 10 hours at a time. By patience and perseverance we have at length accomplished our voyage of 2500 miles, but now I feel at as great a loss as ever. I came here to sell my steamer, but with this comes the idea of abandoning Africa before accomplishing something against the slave-trade; the thought of it makes me feel as though I could not lie in peace in my grave, with all the evils I know so well going on unchecked. What makes it doubly galling is, that while the policy of our Government has, to a very gratifying extent, been successful on the west coast, all efforts on the east coast have been rendered ineffectual by a scanty Portuguese convict population. The same measures have been in operation here, the same expense and the same dangers, the same heroic services have been performed by Her Majesty's cruisers, and yet all in vain. The Zambesi country is to be shut up now more closely than ever, and, unless we have an English settlement somewhere on the mainland, beyond the so-called dominions of the Portuguese, all repressive measures will continue fruitless. I would willingly have gone up some of the other rivers with my steamer, instead of coming here, but I had only three white men with me—a stoker, a sailor, and a carpenter—and seven natives of the Zambesi. The stoker and the sailor had both

severe attacks of illness on the way, and it would have been imprudent to have ascended an unexplored river so short-handed. Could I have entered the Juba, it would have been not so much to explore the river, as to set in train operations by merchants and others which shall eventually work out the destruction of the slave-trade."

The following is an extract from a letter of Dr. Livingstone to the late Admiral Washington:—

"THE Mission of the Universities has been a sore disappointment to me, but on public grounds alone, for it formed no part of my expedition. Before I left the Zambesi, I heard from Bishop Tozer that he had determined to leave the country as early in the present year (1864) as possible. He selected the top of an uninhabited mountain—Morambala, at the mouth of the Shiré—for his mission-station. Fancy a mission-station on the top of Ben Nevis! It is an isolated hill in the middle of a generally flat country; consequently all the clouds collect round the summit, and the constant showers and fogs at certain times make the missionaries run, to avoid being drenched, into the huts. Unlike the first, the second party has been quite useless; they never went near any population that could be taught, and are now about to run away altogether. Wishing to be strictly accurate as to the incredible fact of a missionary bishop without a flock, I made minute inquiry and found that on the mountain there were three native huts at one spot, four at another, and nine at a third; but none, except the first three, within easy access of the station. Twenty-five boys whom we liberated, and gave to the late Bishop Mackenzie, were very unwillingly received by his successor, although without them he would have had no natives whatever to teach. He wished to abandon certain poor women and children who were attached to the mission by Bishop Mackenzie, but Mr. Waller refused to comply with his proposal, and preferred to resign his connection with the mission. In reference to a promise by the Government of Portugal to send out fresh instructions to the Portuguese officials to render us every assistance, which was made in answer to Lord Russell's remonstrance to the authorities at Lisbon, we have only a fresh imposition, in the shape of a tax for residence at Quillimane, on Dr. Kirk's party. It amounted to between 7*l.* and 8*l.*, which, of course, I must pay. The duty of 4*d.* per pound weight on calico seems to say, 'We Portuguese mean to seal up the country more closely than ever.' I never intended to make use of the Zambesi after getting the steamer on the Lake. I only thought, as we had discovered this opening, we ought to make use of it to get up there, and then send out ivory by the Rovuma, during the eight months of the year that it is navigable. I

regret not being able to finish what I had begun. I thank you for the charts of the Rovuma, and shall endeavour to take soundings, not on the bar, for there it none, but opposite the mouth. The only thing like a bar is a phenomenon which occurs at half-ebb, and up to the time when the tide turns, at which period the water, rushing out of the river, falls from 3 or 4 fathoms into 19 fathoms, and thus causes a commotion which might swamp a boat. It lasts, however, but a short time, for as soon as the flow begins all is smooth again. I believe that the Rovuma may be navigable for a vessel of light draught eight or nine months out of the twelve, and the bay is perfectly safe, and magnificent.

“ DAVID LIVINGSTONE.

“ P.S. 24th Feb. 1864.—The Bishop is off before me. I take the boys and children (40 in number) whom he wished to abandon, and send them myself to the Cape. Having once liberated them, I felt in honour bound to see them secure from a return into slavery, and am sure that the gentlemen who sent out the mission would have done the same.”

XVII.—*Visit to Lingah, Kishm, and Bunder Abbass.* By Lieut.-Col. LEWIS PELLY, Acting Political Resident, Persian Gulf. (Communicated by the Secretary to the Government of Bombay.)

Read, June 27, 1864.

I LEFT Bushire in December, 1863, and landed at Lingah, whence I came on to Bassidore, visiting the salt-caves and naphtha-springs on the island of Kishm, and so, passing down the Clarence Straits, touched at Khumeer to see the formations of sulphur and red ochre, and thence crossing to Bunder Abbass, awaited there the return of the mail steamer to Bushire, visiting in the meantime the island of Hormuz.

Lingah contains a fort, and is surrounded by an unwallled town of stone, flanked on either side along the shore line by a series of clusters of houses, overhung with date-trees. The roadstead is open, and though sheltered from the north-west, is dangerous for shipping during the prevailing south-east and south-west winds; but a solid masonry breakwater affords protection to small craft. Lingah may be some 25 miles distant from Bassidore in a north-westerly direction, and is the chief-town of a district lying immediately between the sea and the barren and precipitous mountains which lead up through Lar, and so on to the Shiraz road. The district touches the Sheikhdome of Moghoo on the north-west, and